SDMS Document ID
1054829

SITE INVESTIGATION - FIELD SAMPLING PLAN

Durango Copper Smelter
Durango, Colorado

CERCLIS ID# CO0001399930

EPA Contract No. 68-W5-0031
TDD No. 9602-0007

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FIELD SAMPLING PLAN
for
FOCUSED SITE INSPECTION

Durango Copper Smelter
Durango, Colorado

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1.0 INTRODUCTION

URS Operating Services, Inc. (UOS) has been tasked by the U.S. Environmental Protection Agency (EPA), Region VIII, to conduct a focused Site Inspection (SI) at the Durango Copper Smelter site (CERCLIS ID# CO0001399930) in Durango, La Plata County, Colorado. Field work for this focused SI is projected to be completed during April 1996.

This Field Sampling Plan (FSP) is designed to guide field operations during the focused SI, and has been prepared in accordance with Technical Direction Document (TDD) 9602-0007, the EPA "Guidance for Performing Site Inspections Under CERCLA," Interim Final September 1992, and the "Region VIII Supplement to Guidance for Performing Site Inspections" (U.S. Environmental Protection Agency (EPA) 1992; EPA 1993). The focused SI field work will include sampling and non-sampling data collection. Samples of surface water and sediment will be collected from the Animas River, slag material samples from the existing slag pile, opportunity soil samples from observed terrestrial sensitive environments, and opportunity groundwater samples from potential domestic groundwater users if present. Samples collected will determine if contaminants from the slag pile at the Durango Copper Smelter site are migrating to the surface water and groundwater pathways and are available for soil exposure on and off site. Sampling procedures will adhere strictly to those outlined in the UOS Technical Standard Operating Procedures (TSOPs) for field operations at hazardous waste sites (URS Operating Services, Inc. (UOS) 1995). This FSP is designed to be used in conjunction with the UOS "Preliminary Assessment, Durango Copper Smelter, Durango, Colorado" (UOS 1996b). The focused SI field work will be conducted in conjunction with the Durango Lead Smelter site (CERCLIS ID# CO0001399633). A separate FSP has been prepared for the Durango Lead Smelter site under TDD #9602-0001.

Site characterization samples will potentially include four surface water samples, four sediment samples, one opportunity seep sample, three opportunity groundwater samples, three slag material samples, two opportunity soil samples and three field Quality Assurance/Quality Control (QA/QC) samples (in addition to the laboratory matrix spike/matrix spike duplicate (MS/MSD). The quality assurance samples will follow the requirements of the "Region VIII Supplement to Guidance for Performing Site Inspections under CERCLA" and will include one duplicate surface water sample, one rinsate sample and one trip blank sample. The above mentioned QA/QC samples are collected one per 20 environmental samples for the same matrix (EPA 1993). One water sample and one sediment sample will be collected in triple volume for the laboratory MS/MSD and are not considered additional samples. All samples will be

analyzed through the EPA Contract Laboratories Program (CLP), Routine Analytical Services (RAS) for the target analyte list (TAL) for total metals. Approximately 25% of the samples will be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and pesticides/polychlorinated biphenyls (Pest/PCBs) (Table 2). Additionally, surface water and groundwater samples will be sent to a privately contracted laboratory for total organic carbon (TOC) and hardness analyses (Table 2).

2.0 OBJECTIVES

The purpose of this focused SI is to gather information for the evaluation of this site with regard to the EPA's Hazard Ranking System (HRS) criteria. The specific objectives of this focused SI are:

- Evaluate non-sampling data (i.e., U.S. Department of Energy (DOE) and Bureau of Reclamation (BOR) existing reports and analytical data) documenting past releases from upgradient source areas;
- Collect slag material to determine if there is a threat of potential exposure of site related to site recreational users;
- Collect an opportunity seep sample, if a seep is observed along the Animas River, to document a possible release to the surface water pathway;
- Collect opportunity groundwater samples, if domestic well users are utilizing local groundwater;
- Collect opportunity soil samples from ~~habitat~~ observed ~~occupied by~~ a terrestrial sensitive environment;
- Identify and characterize receptor targets along the surface water pathway (i.e., wetlands and sensitive environments), including size and distance from the site; and
- Collect surface water and sediment samples to determine if there is a release of site contaminants to surface water bodies near the site (i.e., Animas River) and to test for affected target populations.

3.0 BACKGROUND INFORMATION

3.1 SITE LOCATION AND DESCRIPTION

The Durango Copper Smelter site is located in the southeast quarter of Section 32, T. 34 N., R. 9 W., of the Durango East Quadrangle, La Plata County, Colorado (U.S. Geological Survey (USGS) 1963a). The site is located southwest of Durango, along the west bank of the Animas River (Figures 1 and 2). The approximate site coordinates are 37° 15' 00.00" N. latitude and 107° 52' 00.00" W. longitude (USGS 1963a).

3.2 SITE HISTORY AND PREVIOUS WORK

The Durango Copper Smelter opened in 1892 under the name of the Standard Smelting Company. The smelter operated strictly for the treatment of copper ores. The company closed in approximately 1911 (Smith 1980).

Another smelting company (the American Smelting and Refining Company) operated (from 1882 through the mid-1930s, approximately three-quarters of a mile upstream on the Animas River (Smith 1980). This site, the Durango Lead Smelter - CERCLIS ID# CO0001399633, is undergoing a preliminary assessment and site investigation by UOS for the EPA concurrent with the Durango Copper Smelter (Figure 2).

3.3 SITE CHARACTERISTICS

3.3.1 Physical Geography

The Durango Copper Smelter site is located along the west bank of the Animas River. The site is located approximately 6,510 feet above mean sea level in La Plata County (USGS 1963a). The Durango Copper Smelter site is less than one acre in size, or approximately 43,560 square feet (UOS 1996a). Site topography slopes gently to the east toward the Animas River. Slag that exists on the site surface increases the east-trending slope toward the Animas (UOS 1996a). The site area is situated in a transitional area

between the Southern Rocky Mountain Physiographic Province and the Colorado Plateau Province (BOR 1981).

3.3.2 Geology

Two bedrock units, both members of the Mesa Verde Group, underlie the Copper Smelter site area. The Menefee Formation consists of massive sandstone and shale, with beds of carbonaceous shale and coal (DOE 1995; USGS 1949). The Menefee Formation may be as much as 200 feet thick (USGS 1949). The formation is bound to the northwest by a northeast-southwest trending high angle fault that dips to the southeast at approximately 55 degrees. The Menefee Formation overlies the Point Lookout Sandstone Formation bedrock which consists of siltstone with interbedded sandstone and minor amounts of shale (DOE 1995). The top of the Point Lookout Sandstone Formation may be up to 250 feet below ground surface (bgs) (USGS 1949). Surficial deposits consist of colluvium from the slope of Smelter Mountain, glacial outwash, and recent river alluvium. Surficial deposits may be 20 to 30 feet thick in the site area (DOE 1995).

3.3.3 Hydrogeology

Groundwater below the site area is recharged by infiltration of precipitation and by groundwater moving through the bedrock from the west. Groundwater flow in the Point Lookout Sandstone Formation and Menefee Formation is mostly through open bedding planes and joints. Hydrostratigraphic units at the site include the consolidated bedrock unit overlain by unconsolidated surficial deposits. Together the surficial hydrostratigraphic unit (alluvium) and the Menefee Formation directly under the surficial deposits compose the uppermost aquifer in the site area (DOE 1995).

The hydraulic conductivity, as estimated by the DOE during the Uranium Mill Tailings Remedial Action (UMTRA) project near the Durango Lead Smelter site, is 8×10^{-3} centimeters per second (cm/sec) in the alluvium and 8×10^{-5} cm/sec in both the Menefee Formation and Point Lookout Sandstone. Groundwater flows toward and discharges into the Animas River with an average gradient of approximately three percent (DOE 1995).

3.3.4 Hydrology

Site topography indicates that surface water drainage via overland flow is directed to the east toward the Animas River (USGS 1963b). The annual mean discharge rate of the Animas River at Durango is 822 cubic feet per second (cfs); the highest annual mean discharge rate is 1,366 cfs (water years 1898-1994). The discharge rates are recorded at the U.S. Geological Survey (USGS) Durango gauging station approximately one and three-quarters miles upstream of the site (USGS 1994). Upstream of the site area, the Animas River has a drainage area of approximately 770 square miles (DOE 1995). The site lies within the Animas River 100-year flood plain (BOR 1981).

3.3.5 Meteorology

The Durango Copper Smelter site is located in a semiarid climate zone. The mean annual precipitation as totaled from the University of Delaware (UD) database is 12.83 inches. The net annual precipitation as calculated from precipitation and evapotranspiration data obtained from the UD database is 1.61 inches (University of Delaware, Center for Climate Research, Department of Geography 1986). The 2-year, 24-hour rainfall event for this area is 1.5 inches (Dunne and Leopold 1978).

4.0 PRELIMINARY PATHWAY ANALYSIS

4.1 WASTE CHARACTERIZATION

The slag that remains along the west bank of the Animas River is approximately 25 feet thick and covers less than one acre. A foundation, including brick, building rubble, and slag was identified approximately 25 feet east of Highway 550. The volume of slag has been estimated at approximately 13,434 cubic yards of material. Slag from the Durango Copper Smelter site has not been characterized to date (UOS 1996a).

4.2 AIR PATHWAY

Waste slag from the former copper smelter operation lies exposed along the west bank of the Animas River. If contaminants migrated through the air pathway, proximal targets include the total population of 12,430 people of the city of Durango, which is situated within four miles of the site (U.S. Department of Commerce (USDOC) 1990). The nearest residences, the Canyon Club Mobile Home Park, are located to the east of the Animas River, approximately one-half mile north of the site (Figure 2). The prevailing wind direction is to the west-northwest down the river valley (DOE 1995). There are no U.S. Department of the Interior National Wetland Inventory (NWI) maps available for the Durango area. Emergent riverine wetland growth was identified during the site reconnaissance along the 15-mile downstream target distance limit; however, the site visit was conducted outside the growing season, and the cumulative wetland population could not be identified (UOS 1996a).

Additional targets within the air pathway include federally-listed threatened or endangered species present in La Plata County. These species include the American Peregrine Falcon (endangered), Bald Eagle (threatened), Eskimo Curlew (endangered), Southwestern Willow Flycatcher (endangered), Black-footed Ferret (endangered), and the Knowlton's Cactus (endangered). Critical habitat for the Mexican Spotted Owl (threatened) occurs in La Plata county (U.S. Fish and Wildlife Service (USFWS) 1996). A state listing of threatened or endangered species was not available at the time this report was generated.

4.3 GROUNDWATER PATHWAY

Wastes may migrate to the alluvial and bedrock aquifers if they are leaching into groundwater. The DOE has documented 20 wells within a two-mile radius of the site, that serve approximately 47 people based on 2.35 persons per household in Durango (DOE 1995; USDOC 1990). The Colorado State Engineers Office has records of 90 household use only well permits (that serve approximately 211 people) completed to the alluvium and bedrock within two to four miles of the site (State Engineer's Office 1996; USDOC 1990). However, the city of Durango is supplied by municipal water from the Florida and Animas Rivers (Durango Public Works 1996). Development and utility policies for the city of Durango prohibit the drilling of private wells within the city limits.

4.4 SURFACE WATER PATHWAY

Municipal drinking water for the city of Durango is supplied from surface water that is collected from the Florida and Animas Rivers and then mixed and supplied to the entire population of Durango. The main surface water intake for the municipal supply is located along the Florida River, a separate watershed from the Animas River that flows to the south approximately five miles to the east of the site. The municipal surface water intake on the Animas River is located at 29th Street in Durango approximately two miles upstream of the site (Figure 1). Water from the Animas River is used primarily when there is a high demand on the municipal water supply, generally during the summer months (Durango Public Works 1996).

The Durango Copper Smelter site is located on the west banks of the Animas River. Slag was observed adjacent to the river, and small amounts of slag appeared to be sloughing into the river at the site location (UOS 1996a). The Animas River is a recreational fishery. The Colorado Department of Wildlife stocks the Animas River with Brown Trout, Rainbow Trout, and Cutthroat Trout. Native species in the Animas River include the Blue Head Sucker (which is most abundant), Flannel Mouth Sucker, Mottled Sculpin, and Speckled Dace. Occasionally the non-native White Sucker is identified in the Animas River. The stretch of the Animas River from Lightner Creek (one mile north of the site area) to Purple Cliffs (approximately two miles downstream of the Durango Copper Smelter site) was used by approximately 6,200 fisherpersons from April 1990 through August 1990. The fishing limit is two fish, 16 inches or longer (artificial flies and lures only). The catch rate on this stretch of the Animas is 0.75 fish per hour or 1.2 fish per fisher per trip, or approximately 3,000 pounds per year (based on an estimate of 0.4 pounds per fish greater than or equal to a 16-inch fish) (Colorado Division of Wildlife (CDOW) 1996).

The Animas River, a recreational water body, is used for kayaking and river rafting (UOS 1996a). There are no private drinking water intakes identified along the Animas River downstream of the site (Durango Public Works 1996). There are no U.S. Department of the Interior NWI maps for the Durango area; however, riverine wetlands were identified during site reconnaissance activities on February 20 and 21, 1996 by UOS personnel (UOS 1996a).

Aqueous samples collected for the Durango Landfill, Site Inspection Prioritization conducted for the EPA in 1995 by Morrison Knudson Corporation indicate that lead is detected at 75.2 parts per

billion (ppb), which is over the Ambient Water Quality Criteria (AWQC) action level (3.2 ppb) established by the EPA. This sample, collected approximately 1.25 miles downstream of the Durango Copper Smelter site, was used to establish background conditions for the Durango Landfill site, hence, no upgradient sample was collected for comparison (Figure 1) (EPA 1995a; EPA 1995b).

4.5 SOIL EXPOSURE PATHWAY

The Durango Copper Smelter site property is owned by the city of Durango and is classified as open/agricultural land (DOE 1995; La Plata County Assessors Office 1996). Currently the State of Colorado plans to sell the property just north of the site to the Bureau of Reclamation for the installation of a pumping plant as a part of the Animas/La Plata Wastewater Management Plan (Colorado Department of Public Health and the Environment (CDPHE) 1996).

Access to the site is not restricted to the public and a public bike path traverses the eastern portion of the slag pile (Figure 2) (UOS 1996a). Approximately 4,143 people reside within one mile of the site (USDOC 1990). Other potential targets include federally-listed threatened or endangered species that may potentially be present in La Plata County. These species include the Black-footed Ferret (endangered), Knowlton's Cactus (endangered), American Peregrine Falcon (endangered), Bald Eagle (threatened), Eskimo Curlew (endangered), and the Southwestern Willow Flycatcher (endangered). Critical habitat for the Mexican Spotted Owl (threatened) occurs in La Plata County (USFWS 1996).

5.0 FIELD PROCEDURES

5.1 CONCEPT OF OPERATIONS

5.1.1 Schedule

Field work is scheduled for early spring 1996 so that surface water samples can be collected prior to heavy spring runoff. Sampling is estimated to be completed in approximately two days. Non-sampling data collection will be performed as appropriate

(Table 2). Sampling will be completed in conjunction with the Durango Lead Smelter SI (TDD# 9602-0001).

5.1.2 Safety

All field activities will be conducted in strict accordance with an approved Site Health and Safety Plan, which will be developed before the start of field activities. It is anticipated that all field work can be accomplished in Level D personal protective equipment.

5.1.3 Site Access and Logistics

UOS will obtain site access with the assistance, if necessary, of the Region VIII Site Assessment Manager for this site. UOS will have written consent from all property owners (on site and off-site) prior to the field sampling event.

5.2 SAMPLE LOCATIONS

This focused SI involves the collection of 20 field samples (Table 3). These samples will potentially include four surface water samples, four sediment samples, one opportunity seep sample, three opportunity groundwater samples, three slag samples, two opportunity soil samples, and three QA/QC samples (one duplicate surface water sample, one rinsate sample and one trip blank sample). One water sample and one sediment sample will be collected in triple volume for the laboratory MS/MSD and are not considered additional samples. All sample locations will be located with a Global Positioning System (GPS) device after sample collection. This procedure will allow documentation of changes in sample locations as they occur in the field due to unanticipated site conditions.

Surface water and sediment samples will be collocated. Sample DC-SW/SE-1 will be collected from the Animas River upstream of site influences. Sample DC-SW/SE-2 will be collected from the Animas River at or just below the Durango Copper Smelter probable point of entry (PPE). The exact location will be determined in the field based on site observations and conditions. Sample DC-SW/SE-3 will be collected from the Animas River approximately one mile downstream of the Durango Copper Smelter PPE. Sample DC-SW/SE-4 will be collected from

the Animas River approximately one and one-half miles downstream of the Durango Copper Smelter PPE.

Samples DC-SO-1, DC-SO-2, and DC-SO-3 will be slag material samples collected from the exposed slag pile located at the site. Samples DC-SO-4 and DC-SO-5 will be opportunity soil samples collected from a terrestrial sensitive environment if observed. The opportunity seep sample (DC-SP-7) will be collected if a seep is identified during field activities downstream of the site along the Animas River. Opportunity groundwater samples DC-GW-1, DC-GW-2, and DC-GW-3 will be collected from potential domestic groundwater users if present. Please refer to Table 1 (Sample Locations and Rationale) and Figure 2 (Sample Location Map) for more detailed information about sample locations.

5.3 SAMPLING METHODS

5.3.1 Surface Water Sampling

Surface water sampling will be conducted according to UOS TSOP 4.18, "Surface Water Sampling" or by immersing the sample bottles directly into the sample media. UOS will measure field parameters which include pH, temperature and electrical conductivity of each sample collected as described in TSOP 4.14 "Water Sample Field Measurements." All data will be recorded on appropriate sample forms. Sampling will be conducted from the farthest downstream location to the farthest upstream location to minimize the potential for cross contamination. All surface water sample locations will be photographed and documented during sampling activities (UOS 1995). If wetlands are observed in the field, they will be assessed to determine if they meet the 40 CFR 230.3 Definition of a Wetland; this information will be entered into the logbook.

5.3.2 Sediment Sampling

Sediment sampling will be conducted according to UOS TSOP 4.17, "Sediment Sampling" (UOS 1995). Sediment sampling locations will correspond to surface water sampling locations (Figure 2) (Table 1). Sediment sampling will be conducted using a stainless steel spoon or scoop and a stainless steel bowl. Sediment sampling will be conducted

with surface water sampling and will occur after the surface water sample has been collected, proceeding from the most downstream location to the most upstream location. All sediment sample locations will be photographed and documented during sample activities (UOS 1995).

5.3.3 Soil/Source Sampling

Soil and source samples will be collected in accordance with procedures described in UOS TSOP 4.16 "Surface and Shallow Depth Soil Sampling." Stainless steel hand augers, bowls, and spoons will be used for soil collection. All soil samples will be collected as biased grab samples from the zero to two-foot depth interval. The soil matrix will be placed in a stainless steel bowl and mixed to homogenize. Samples will be placed in appropriate sample containers. Sample description will be logged in the field log book with standard geologic descriptions.

5.3.4 Groundwater Sampling

Groundwater sampling will be conducted according to those procedures outlined in UOS TSOP 4.12, "Groundwater Sampling." All groundwater sampling locations will be photographed and documented in accordance with the procedures outlined in UOS TSOP 4.5, "Sample Location Documentation," (UOS 1996).

5.4 CONTROL OF CONTAMINATED MATERIALS

Investigation-derived waste (IDW) generated during the focused SI will be contained in accordance with UOS TSOP 4.8, "Investigation Derived Waste Management," and the OERR Directive 9345.3-02, "Management of Investigation Derived Waste During Site Inspections," May 1991 (EPA 1991).

5.5 ANALYTICAL PARAMETERS

Table 3 consists of the Sample Plan Checklist which details all sample parameters. Samples collected for this focused SI will be analyzed by CLP-RAS. RAS inorganic evaluation will

accomplished through TAL total metals analysis. Approximately 25% of the samples will be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and pesticides/polychlorinated biphenyls (Pest/PCBs) (Table 2). Additionally, surface water and groundwater samples will be sent to a privately contracted laboratory for TOC and hardness analyses (Table 2).

6.0 FIELD QUALITY CONTROL PROCEDURES

All samples will be handled and preserved as described in UOS TSOP 4.2, "Sample Containers, Preservation and Maximum Holding Times." Calibration of the pH/temperature and conductivity meters will follow instrument manufacturers' instruction manuals and UOS TSOP 4.14, "Water Sample Field Measurements." All samples will progress from downstream to upstream to prevent cross contamination (UOS 1995).

All sampling equipment will be decontaminated prior to initial use. All non-disposable sampling equipment will be decontaminated after the collection of each sample in accordance with UOS TSOP 4.11, "Equipment Decontamination." Basic decontamination will consist of brushing gross particulate off sampling equipment with a scrub brush, followed by washing equipment with a solution of Liquinox® and distilled water, rinsing with distilled water, rinsing with methanol, and finally rinsing with distilled water. After decontamination, the equipment will be allowed to gravity drain and then will be wrapped in aluminum foil to minimize potential contamination (UOS 1995).

The following samples will be collected to evaluate quality assurance at the Durango Copper Smelter site in accordance with the "Guidance for Performing Site Inspections under CERCLA," Interim Final September 1992 and the "Region VIII Supplement to Guidance for Performing Site Inspections under CERCLA" (EPA 1992; EPA 1993):

- One rinsate blank for the sediment/soil matrix will be collected for the site;
- One trip blank for VOC analyses only will be collected for the site;
- One duplicate surface water sample per set of 20 surface water samples collected. One will be required for this site; and

- Two triple volume samples (one water and one sediment) to be used for a MS/MSD (the triple volume samples will not be labeled as separate samples).

7.0 CHAIN OF CUSTODY

After sample collection and identification, all samples will be handled in strict accordance with the chain-of-custody protocol specified in UOS TSOP 4.3, "Chain of Custody" (UOS 1995).

8.0 DATA REDUCTION, VALIDATION AND REPORTING

Within ten working days after the return of the sampling crew to the Denver Office, UOS will prepare a Sampling Activities Report (SAR). An ARR is scheduled to be submitted by August 20, 1996 as per the TDD for this project. Data validation will be conducted by Region VIII EPA. The SAR and ARR will conform to the "Guidance for Performing Site Inspections under CERCLA," Interim Final September 1992 and the "Region VIII Supplement to Guidance for Performing Site Inspections under CERCLA" (EPA 1992; EPA 1993).

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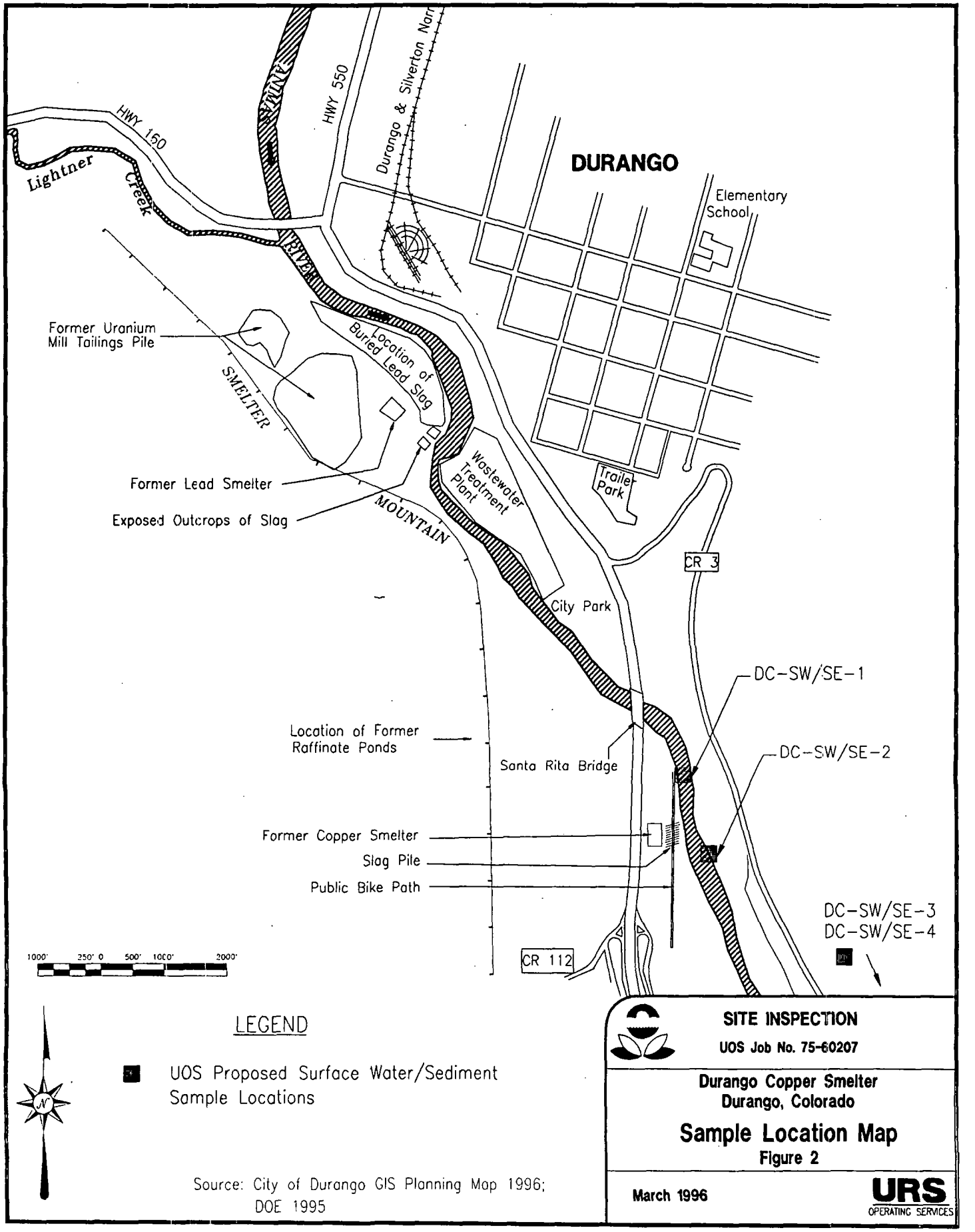
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TABLE 1
Sample Locations and Rationale

Matrix	Sample #	Location	Rationale
Surface Water Samples	DC-SW-1	Collected from a location upgradient of the site PPE. To be field located.	Document background conditions along the Animas River.
	DC-SW-2	Collected from the Animas River at or just below the PPE. To be field located.	Test for potential site impact on targets associated with the Animas River.
	DC-SW-3 (MS/MSD)	Collected from the Animas River approximately one mile downstream of the PPE. To be field located.	Test for potential site impact on targets associated with the Animas River. The MS/MSD collected to test the precision of laboratory analytical methods.
	DC-SW-4	Collected from the Animas River approximately one and one-half miles downstream from the PPE. To be field located.	Test for potential site impact on targets associated with the Animas River.
Sediment Samples	DC-SE-1	Collected from a location upgradient of the site PPE. To be field located.	Document background conditions on the Animas River.
	DC-SE-2	Collected from the Animas River at or just below the PPE. To be field located.	Test for potential site impact on targets associated with the Animas River.
	DC-SE-3 (MS/MSD)	Collected from the Animas River approximately one mile downstream of the PPE. To be field located.	Test for potential site impact on targets associated with the Animas River. The MS/MSD collected to test the precision of laboratory analytical methods.
	DC-SE-4	Collected from the Animas River approximately one and one-half miles downstream of the PPE. To be field located.	Test for potential site impact on targets associated with the Animas River.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Soil Samples	DC-SO-1	Collected from the exposed slag pile at the site.	Characterize contaminants in slag pile and test for potential impact to site recreation users.
	DC-SO-2	Collected from the exposed slag pile at the site.	Characterize contaminants in slag pile and test for potential impact to site recreation users.
	DC-SO-3	Collected from the exposed slag pile at the site.	Characterize contaminants in slag pile and test for potential impact to site recreation users.
	DC-SO-4	Opportunity background soil sample	Establish background conditions if a terrestrial sensitive environment is sampled (DC-SO-5).
	DC-SO-5	Opportunity soil sample.	Test for potential contamination to a terrestrial sensitive environment.
Opportunity Groundwater Samples	DC-GW-1	Opportunity background groundwater sample if potential domestic groundwater users are present.	Document background conditions for the alluvial or bedrock aquifers. To be field located.
	DC-GW-2	Collected from a nearby residence.	Test for potential drinking water contamination in groundwater from the alluvial or bedrock aquifers. To be field located.
	DC-GW-3	Collected from a nearby residence.	Test for potential drinking water contamination in groundwater from the alluvial or bedrock aquifers. To be field located.
Opportunity Seep Sample	DC-SP-7	Collected along the Animas River if a seep is identified downgradient of the site during field sampling activities.	Document potential for contaminated groundwater discharging to surface water of the Animas River.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
QA/QC Samples	DC-SW-5	Duplicate of sample DC-SW-4.	Quality Assurance sample to document the ability to collect collocated samples.
	DC-SW-6	Rinsate Blank.	Document thoroughness of decontamination process.
	DC-SW-7	Trip Blank.	Document potential for contamination via transport.

TABLE 2
Non-Sampling Data Collection Rationale

Data Element	Data Collection Strategy and Rationale
Sensitive Environments	Locate, measure and photograph any wetlands observed, meeting the 40 CFR 230.3 definition along the Animas River and the overland migration pathway. Observe site for indicators or evidence of terrestrial sensitive environments or threatened and endangered species.
Surface Water Pathway	Locate and identify potential seeps along the Animas River.
Groundwater Pathway	Locate grandfathered domestic groundwater users and collect samples from the wells if present.

TABLE 3
Sample Plan Checklist

Sample Location	Sample Type	Field Parameters			Analysis					Quality Control Samples		
		Temp	pH	Cond	Total Metals	VOC	SVOC	Pest/PCB	TOC/Hardness	Dup	Spike	Blank
DC-SW-1	Surface Water	X	X	X	X	X	X	X	X			
DC-SW-2	Surface Water	X	X	X	X	X	X	X	X			
DC-SW-3	Surface Water	X	X	X	X				X		X	
DC-SW-4	Surface Water	X	X	X	X				X			
DC-SE-1	Sediment				X	X	X	X				
DC-SE-2	Sediment				X	X	X	X				
DC-SE-3	Sediment				X						X	
DC-SE-4	Sediment				X							
DC-SP-7	Opportunity Seep	X	X	X	X							
DC-SO-1	Soil				X							
DC-SO-2	Soil				X							
DC-SO-3	Soil				X							
DC-SO-4	Opportunity Soil				X							
DC-SO-5	Opportunity Soil				X							
DC-GW-1	Opportunity Groundwater	X	X	X	X							
DC-GW-2	Opportunity Groundwater	X	X	X	X							
DC-GW-3	Opportunity Groundwater	X	X	X	X							
DC-SW-5	Surface Water Duplicate	X	X	X	X				X	X		
DC-SW-6	Rinsate Blank				X	X	X	X				X
DC-SW-7	Trip Blank					X						X

* Analytical methods for total metals analysis are defined in the U.S. EPA CLP Statement of Work for Inorganic Analysis Multi-media, Multi-concentration ILM03.0, 1993.

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TABLE 4
Sample Container Types, Volumes, and Sample Preservatives

Sample Matrix	Analysis	Container	Required Volume	Preservation*	Holding Time
Surface Water and Groundwater	Total Metals	High Density Polyethylene bottle and cap	1 - 1 liter	4°C; Nitric Acid to pH <2	6 months (Hg - 28 days)
Surface Water and Groundwater	VOC	VOC Amber Glass Vial	2 - 40 ml	4°C	14 Days
Surface Water and Groundwater	SVOC	1 liter Amber Glass	2 - 1 liter	4°C	7 Days
Surface Water and Groundwater	Pest/PCB	1 liter Amber Glass	2 - 1 liter	4°C	7 Days
Surface Water and Groundwater	TOC	1 liter Amber Glass	1 - 1 liter	H_2SO_4 to pH <2	28 days
Surface Water and Groundwater	Hardness	High Density Polyethylene bottle and cap	1 - 1 liter	H_2SO_4 to pH <2	6 Months
Soil/Source/ Sediment	Total Metals	High Density Polyethylene bottle and cap	1 - 8 ounce	4°C	6 months (Hg - 28 days)
Soil/Source/ Sediment	VOC	Glass	1 - 4 ounce	4°C	14 Days
Soil/Source/ Sediment	SVOC	Glass	1 - 8 ounce	4°C	7 Days
Soil/Source/ Sediment	Pest/PCB	Glass	1 - 8 ounce	4°C	7 Days

* Sample preservation will be performed by the sampler after sample collection.

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Superfund Technical Assessment and Response Team - Region VIII

United States
Environmental Protection Agency

Contract No. 68-W5-0031

SITE INVESTIGATION
FIELD SAMPLING PLAN

DURANGO COPPER SMELTER
Durango, Colorado

TDD No. 9602-0007

MARCH 29, 1996

URS
OPERATING SERVICES, INC.

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